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Temperature Dependence of the Magnetic Penetration Depth in the Case of the Coexistence of Charge Density Waves and Superconductivity

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Abstract

© 2015 Springer Science+Business Media New York An analytical expression for the temperature dependence of the superfluid density in the regime of the coexistence of charge density waves (CDW) and superconductivity has been derived beyond the effective mass approximation. In contrast to the previous research on this subject, possible dispersions of both order parameters have been taken into account. In particular, it was found that when the CDW gap parameter depends on the wave vector, London's type current is nonzero even above (Formula presented.), i.e., in the interval (Formula presented.). The results of numerical calculations are discussed in the context of available experimental data for underdoped cuprates.

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Keywords

Charge density waves, High-temperature superconductivity, Magnetic penetration depth, Superfluid density